



Patent
Attorney's Docket No. 005950-774

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

DAHL, et al.

Application No.: 10/047,044

Filed: January 14, 2002

For: DIAMONDOID-CONTAINING
MATERIALS IN MICROELECTRONICS

Group Art Unit: Unassigned

Examiner: Unassigned

RECEIVED
AUG -9 2002
TECHNOLOGY CENTER 2800

**INFORMATION DISCLOSURE STATEMENT
TRANSMITTAL LETTER**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed is an Information Disclosure Statement and accompanying form PTO-1449 for the above-identified patent application.

- ☒ No additional fee for submission of an IDS is required.
- ☐ The fee of \$180.00 (126) as set forth in 37 C.F.R. § 1.17(p) is also enclosed.
- ☐ A certification under 37 C.F.R. § 1.97(e) is also enclosed.
- ☐ A certification under 37 C.F.R. § 1.97(e), and the fee of \$180.00 (126) as set forth in 37 C.F.R. § 1.17(p) are also enclosed.
- ☐ Charge \$_____ to Deposit Account No. 02-4800 for the fee due.
- ☐ A check in the amount of \$_____ is enclosed for the fee due.

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800. This paper is submitted in duplicate.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

P.O. Box 1404
Alexandria, Virginia 22313-1404
(650) 622-2300

Date:

8/7/02

By: Stephen F. Powell
Stephen F. Powell
Registration No. 43,014



Patent
Attorney's Docket No. 005950-774

RECEIVED
AUG - 9 18 2002
TECHNOLOGY CENTER 2800

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
DAHL, et al.)
Application No.: 10/047,044) Group Art Unit: Unassigned
Filed: January 14, 2002) Examiner: Unassigned
For: DIAMONDROID-CONTAINING MATERIALS)
IN MICROELECTRONICS)

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the duty of disclosure as set forth in 37 C.F.R. § 1.56,
Applicants hereby submit the following information in conformance with 37 C.F.R. §§
1.97 and 1.98. Pursuant to 37 C.F.R. § 1.98(d), copies of the references cited below are
included herewith:

U.S. Patents

	<u>Patent Number</u>	<u>Name</u>	<u>Issue Date</u>
1.	3,457,318	Capaldi et al.	7/22/69
2.	3,832,332	Thompson	8/27/74
3.	4,142,036	Feinstein et al.	2/27/79
4.	4,273,561	Fernandez- Villalbos	6/16/81
5.	4,952,747	Alexander et al.	8/28/90

6.	4,952,748	Alexander et al.	8/28/90
7.	4,952,749	Alexander et al.	8/28/90
8.	4,982,049	Alexander et al.	1/1/91
9.	4,996,079	Itoh	2/26/91
10.	5,015,758	Pilgrim et al.	5/14/91
11.	5,017,734	Baum et al.	5/21/91
12.	5,019,660	Chapman et al.	5/28/91
13.	5,019,665	Partridge et al.	5/28/91
14..	5,053,434	Chapman	10/1/91
15.	5,238,705	Hayashi et al.	8/24/93
16.	5,245,104	Cullick	9/14/93
17.	5,256,391	Chen et al.	10/26/93
18.	5,268,513	Shen	12/7/93
19.	5,298,666	Shen	3/29/94
20.	5,306,851	Wu et al.	4/26/94
21.	5,308,661	Feng et al.	5/3/94
22.	5,313,094	Beyer et al.	5/17/94
23.	5,319,518	Blood	6/7/94
24.	5,347,063	Shen et al.	9/13/94
25.	5,367,051	Narang et al.	11/22/94
26.	5,369,213	Shen	11/29/94
27.	5,380,947	Chen et al.	1/10/95
28.	5,382,684	Moini et al.	1/17/95
29.	5,394,733	Acholla	3/7/95
30.	5,397,488	Chen et al.	3/14/95
31.	5,410,092	Shen	4/25/95
32.	5,414,189	Chen et al.	5/9/95

33.	5,416,188	Chiang et al.	5/16/95
34.	5,430,193	Shen	7/4/95
35.	5,449,531	Zhu et al.	9/12/95
36.	5,455,072	Bension et al.	10/3/95
37.	5,461,184	Swanson	10/24/95
38.	5,462,680	Brois et al.	10/31/95
39.	5,462,776	Gruen	10/31/95
40.	5,498,812	Bradway et al.	3/12/96
41.	5,540,977	Vogelsang et al.	7/30/96
42.	5,547,748	Ruoff et al.	8/20/96
43.	5,576,355	Chen et al.	11/19/96
44.	5,635,581	Chiang et al.	6/3/97
45.	5,695,847	Browne	12/9/97
46.	5,739,376	Bingel	4/14/98
47.	5,767,578	Chang et al.	6/16/98
48.	5,773,921	Keesmann et al.	6/30/98
49.	5,780,101	Nolan et al.	7/14/98
50.	5,849,130	Browne	12/15/98
51.	5,861,135	Tanabe et al.	1/19/99
52.	5,874,175	Li	2/23/99
53.	5,874,775	Shiomi et al.	2/23/99
54.	5,880,154	Boukrinskai et al.	3/9/99
55.	5,907,189	Mertol	5/25/99
56.	5,925,465	Ebbesen et al.	7/20/99
57.	5,958,523	Bradic	9/28/99
58.	5,965,202	Taylor-Smith et al.	10/12/99
59.	5,976,909	Shiomi et al.	11/2/99

60.	6,080,470	Dorfman	6/27/00
61.	6,162,412	Fujimori et al.	12/19/00
62.	6,174,780	Robinson	1/16/01
63.	6,187,427	Taylor-Smith et al.	2/13/01
64.	6,211,463	Fabis	4/3/01
65.	6,222,113	Ghoshal	4/24/01
66.	6,235,851	Ishii et al.	5/22/01
67.	6,250,984	Jin et al.	6/26/01
68.	6,256,996	Ghoshal	7/10/01
69.	6,261,942	Zhou et al.	7/17/01
70.	6,277,766	Ayers	8/21/01
71.	6,286,212	Eaton	9/11/01
72.	6,300,410	Shachat et al.	10/9/01
73.	6,312,768	Rode et al.	11/6/01
74.	6,316,084	Claus et al.	11/13/01
75.	6,316,826	Yamamoto et al.	11/13/01

Foreign Patents

76.	WO 95/11472	4/27/95
77.	EP 0399 851	11/20/96

Articles

78. Aczel, et al., "Stability of Adamantane and its Derivatives to Coal-liquefaction Conditions, and its implications toward the organic structure of Coal", *Fuel*, Vol. 58, pp. 228-230, (3/1979)
79. Ansell, M., "Diamond Cleavage", publication unknown (4 pages)
80. Balaban, et al., Systemic Classification and Nomenclature of Diamond Hydrocarbons-I, *Tetrahedron*, 34, pp. 3599-3606, (1978)

81. Badziag, P., et al., "Nanometre-sized Diamonds are More Stable than Graphite", *Nature*, Vol. 343, pp. 244-245, and 517 (1/1990).
82. Bagrii, Ye, et al., "Catalytic Breakdown of Paraffinic Hydrocarbons in the Presence of Adamantanes", *Petrol. Chem USSR*, Vol. 30, No. 2, pp. 131-134, (1990)
83. Baughman, GL, "Dibromination of Adamantane", Publication Unknown, Vol. 29, pp. 238-240 (January 1964).
84. Bhushan, B., (editor), "Influence of Film Structure and Composition on Some Typical Properties", Modern Tribology Handbook, Vol. Two, p. 891.
85. Bhushan, B., (editor), "Self Assembled Monolayers for Controlling Hydrophobicity and/or Friction and Wear", in Modern Tribology Handbook, Ch. 25, pp. 909-929.
86. Bingham, RC, et al., "Recent Developments in the Chemistry of Adamantane and Related Polycyclic Hydrocarbons", Chemistry of Adamantanes, Ch. 18, pp. 1-101 (1970).
87. Bobrov, K., et al., "Atomic-scale Imaging of Insulating Diamond through Resonant Electron Injection", *Nature*, Vol. 413, pp. 616-619 (10/11/01).
88. Bott, Von K., "Synthese von Adamantan-und Norbornan chloressigsäuren mit Trichloräthylen", *Angew. Chem.*, Vol. 79, pp. 943-945 (1967).
89. Broich, F., "Carbonsäuresynthesen mit 1,1-Dichloräthylen", *Angew. chem.*, vol. 78, pp. 932-936 (1966).
90. Cammas, S., et al., "Poly(β -malic acid): Obtaining High Molecular Weights by Improvement of the Synthesis Route", *Polymer*, Vol. 37, No. 18, pp. 4215-4220 (1996).
91. Chung, et al., Recent Developments in High-Energy Density Liquid Fuels, *Energy Fuels*, 13, pp. 641-649, (1999).
92. Courtney, T., et al., "The Chemistry of Diamantane: Part 1 - Synthesis and Some Functionalisation Reactions", *J.C.S. Perkin I*, pp. 2691-2696 (1972).
93. Dahl, J., et al., Diamondoid Hydrocarbons as Indicators of Natural Oil Cracking, *Nature*, 399, pp. 54-57, (1999)
94. Das, M., (editor), "Diamond-Like Amorphous Carbon Films" as presented at Physics of Novel Materials, Proceedings of the Tenth Physics Summer School, Canberra, Australia, January 13-31, 1997, p. 221.

95. Dresselhaus, MS, et al., "Nanotechnology in Carbon Materials", Nanotechnology, Ch. 7, pp. 285-329, AIP Press (1999).
96. Drexler, Eric K., "*Nanosystems: Molecular Machinery Manufacturing and Computation*", John Wiley & Sons, pp.238-249, (1992)
97. Erdemir, Ali, et al., "Tribology of Diamond, Diamond-Like Carbon and Related Films", Modern Tribology Handbook, Vol. Two, Ch. 24, pp. 871-908, CRC Press LLC, (1999).
98. Fort, Jr., et al., Adamantane: Consequences of the Diamondoid Structure, *Chem. Rev.*, 64, pp. 277-300, (1964)
99. Gruen, D.M., "Applications of Ultrananocrystalline Diamond Films", publication unknown, pp. 313-317 (January 2000).
100. Gruen, D.M., "Microstructure and Grain Boundaries of Ultrananocrystalline Diamond Films", publication unknown, pp. 307-312, (January 2000).
101. Gruen, D.M., "Nucleation of Ultrananocrystalline Diamond Films", publication unknown, pp. 303-306 (January 2000).
102. Haaf, W., "Untersuchungen uber die Ritter-Reacktion", *Jahrgang 96*, pp. 3359-3369 (1963) (in German).
103. Hala, V.S., et al., "Analyse Unds erwendung on Pyrolyseol", *Jahrgang 24*, pp. 85-87, (2/1971) In German- English Abstract on page 85.
104. Koch, H., "Direkte Syntese der Adamantan-carbonsaure-(1)", *Eingengangen Am.*, 29, p. Z 944 (1960).
105. Kopidakis, G., et al., "Discrete Breathers in Realistic Models: Hydrocarbon Structures", *Physica B*, Vol. 296, pp. 237-250 (2001).
106. Kulisch, W., "Nucleation of Diamond", Deposition of Diamond-Like Superhard Materials, Ch. 4.2, pp. 134-141, Springer-Verlag, Berlin-Heidelberg, (1999).
107. Kulisch, W., "Table 1. Physical Constants for C_{60} Molecules and for Crystalline C_{60} ", Deposition of Diamond-Like Superhard Materials, p. 290, Springer-Verlag, Berlin-Heidelberg, (1999).
108. Liaw, Der-Jang, et al., "Synthesis and Characterization of new Polyamides and Polyimides Prepared from 2,2-bis[4-(4-aminophenoxy)phenyl]adamantane", *Macromol. Chem. Phys.*, 200, No. 6, pp. 1326-1332 (1999)

109. Lin, et al., Natural Occurrence of Tetramantane ($C_{22}H_{23}$), Pentamantane ($C_{26}H_{32}$), and Hexamantane ($C_{30}H_{36}$) in a Deep Petroleum Reservoir, *Fuel*, 74:10, pp. 1512-1521, (1995)
110. McKervey, Synthetic Approaches to Large Diamondoid Hydrocarbons, *Tetrahedron*, 36, pp. 971-992, (1980)
111. Machacek, V., et al., "Let Od Objeveni Adamantanu", *Chemicke Listy/svazek* 76, pp. 753-761, (1982) (Russian - English Abstract on p. 761).
112. Moine, L., et al., "Polymers of Malic Acid Conjugated with the 1-adamantyl Moiety as Lipophilic Pendant Group", *Polymer*, Vol. 38, No. 12, pp. 3121-3127 (1997).
113. Moiseev, IK, et al., "Reactions of Adamantanes in Electrophilic Media", *Russian Chem. Reviews*, Vol. 68, No. 12, pp. 1001-120 (1999).
114. Oya, A, et al., "Carbonization of Adamantanes to a Graphitizable Carbon", *Fuel*, Vol. 60, pp. 667-669, (8/1981).
115. Petrov, A., "Hydrocarbons of Adamantane Series as Indices of Petroleum Catagenesis Process", *Advances in Organic Geo Chemistry*, 6th International Meeting on Organic Geochemistry, pp. 517-522 (1973).
116. Prawer, S., "The Wonderful World of Carbon", appearing in *Physics of Novel Materials*, Proceedings for the Tenth Physics Summer School, Canberra, pp. 205-234, Australia January 13-31, 1997.
117. Prusova, D., Liquid Chromatography of Adamantanes and Carbon Adsorbents", *J. Chrom*, 234, pp. 1-11, (1982).
118. Rollmann, L., et al., "Adamantanes from Petroleum, with Zeolites", *Catalysis Today*, 31, pp. 163-169 (1996).
119. Rouhi, A., et al., "Tinkertoy Dreams: Someday, Computers May be Run by Electronic Circuits Based on Single Giant Molecules", *Science and Technology*, pp. 46-49 (7/30/01).
120. Sandia National Laboratories (2000), World's First Diamond Micromachines Created at Sandia, Press Release, (2/22/2000), www.Sandia.gov
121. Schleyer, P., et al., "Nonacyclo[11.7.1.1^{2,18}.0^{3,16}.0^{4,13}.0^{5,10}.0^{6,14}.0^{7,11}.0^{15,20}]-Docosane¹, a Bastard Tetramantane²", *J. of the Am. Chem. Soc.*, 90:8, letter to the editor, (8/28/68).
122. Shen, M., et al., "Finite T_d Symmetry Models for Diamond: From Adamantane to Superadamantane ($C_{35}H_{36}$), *J. Am., Chem. Soc.*, Vol. 114, No. 2, pp 497-505, (1992).

123. Smith, G., et al., "Some Reactions of Adamantane and Adamantane Derivatives", *publication unknown*, Vol. 26, pp. 2207-2212 (1961).
124. Stetter, H., et al., "Monofunktionelle Adamantan-Derivate", *Angew. Chem.*, 71, pp.429-430 (1959).
125. Supryadkina, NY, et al., "Catalytic Dealkylation of Alkyladamantanes", *Petrol. Chem., USSR*, Vol. 28, No. 2, pp. 103-110, (1988)
126. Tachikawa, T., "Assembly and Packaging", ULSI Technology, Ch. 10, pp. 530-586, McGraw-Hill, (1996).
127. Timp, Gregory (editor), "Table 2.1 - Diamond Like Materials", Nanotechnology, Ch. 2, p. 28, AIP Press (1999).
128. Tominaga, K., et al., "Next-generation Fine Chemicals Raw Material-Adamantane", *Chem Econ & Eng. Review*, Vol. 17, No. 10, pp. 23-36, (10/1985).
129. Vodicka, L, et al., "High Performance Liquid Chromatography of Halogeno Derivatives of Adamantane and Diamantane", *J. Chrom.*, 270, pp. 199-205, (1983).
130. von R. Schleyer, P., et al., "The Preparation and Reactivity of 2-Substituted Derivatives of Adamantane ^{1, 2}", *Frick Chemical Laboratory*, Vol. 83, pp. 182-187 (1961).
131. Wingert, W., "G.c.-m.s. Analysis of Diamondoid Hydrocarbons in Smackover Petroleums", *Fuel*, Vol. 71, pp. 37-42, (1/1992)
132. Windischmann, H., "CVD Diamond for Thermal Management", *publication unknown*, Chapter C2.2, pp. 410 - 415, (January 2000)
133. Wolf, S., (editor), "Dielectric materials for Multilevel Interconnects", Silicon Processing for the VLSI Era, Ch. 4.3.2, pp. 194-199, Lattice Press, (1990).
134. Yokoyama, T., et al., "Selective Assembly on a Surface of Supramolecular Aggregates with Controlled Size and Shape", *Letters to Nature*, Vol. 413, pp. 619-621, (10/11/01).
135. Zhu, W., et al., "Novel Cold Cathode Materials", Vacuum Microelectronics, Ch. 6, pp. 247-287, John Wiley & Sons, Inc., (2001).

The documents are being submitted within three months of the filing or entry of the national stage of this application or before the first Office Action on the merits, whichever is later, therefore no fee or certification is required under 37 C.F.R. §1.97(b).

While this Information Disclosure Statement may contain "material" information pursuant to 37 C.F.R. § 1.56, it is not intended to constitute an admission that any patent, publication or other information referred to herein is "prior art" to the invention disclosed and claimed in the above-referenced application unless specifically designated as such.

Applicants specifically reserve the right, where appropriate, to antedate any such reference by the appropriate showing under 37 C.F.R. § 1.131 and § 1.608, or any other appropriate means.

This Information Disclosure Statement is not a representation that a search has been made or that no other information material to the patentability of this invention exists. To assist the Examiner, the document are listed on the attached form PTO-1449. It is respectfully requested that an Examiner-initialed copy of this form be returned to the undersigned.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: Stephen F. Powell
Stephen F. Powell
Registration No. 43,014

P.O. Box 1404
Alexandria, Virginia 22313-1404
Phone: (650) 622-2300

Date: 8/7/02